

CLAIMS

What is claimed is:

1. An x-ray optical device comprising:
a two-dimensional optic which conditions x-rays from an x-ray source; and
at least one aperture including a fixed portion and a movable portion that is
movable relative to the fixed portion to adjust the convergence of the x-rays by
selectively occluding a portion of the x-rays.
2. The x-ray optical device of claim 1 wherein the fixed portion is a slit and the
movable portion is a blade that moves across the slit.
3. The x-ray optical device of claim 1 wherein the fixed portion is a pinhole and the
movable portion is a blade that moves across the pinhole.
4. The x-ray optical device of claim 1 wherein the fixed portion is a stationary blade
and the movable portion is a movable blade.
5. The x-ray optical device of claim 1 further comprising a second aperture
positioned adjacent to or near a sample.
6. The x-ray optical device of claim 5 wherein the second aperture is one of a slit or
a pinhole.
7. The x-ray optical device of claim 5 wherein the second aperture is a slit.
8. The x-ray optical device of claim 5 wherein the second aperture is a pinhole.

9. The x-ray optical device of claim 1 wherein the movable portion is movable between a high-convergence position and a low-convergence position.
10. The x-ray optical device of claim 1 further comprising a second movable portion, the second movable portion being movable with respect to the first movable portion and the fixed portion.
11. The x-ray optical device of claim 1 wherein the optic is a multilayer optic.
12. The x-ray optical device of claim 1 wherein the optic is an x-ray reflective crystal.
13. The x-ray optical device of claim 1 wherein the aperture is positioned between the optic and a sample.
14. The x-ray optical device of claim 13 wherein the aperture is positioned at or near a distal portion of the optic relative to the source.
15. The x-ray optical device of claim 1 wherein the aperture is positioned between the optic and the source.
16. An x-ray reflective optic comprising:
 - a first optical element defining a first reflective surface;
 - a second optical element defining a second reflective surface, the first and second reflective surfaces reflecting x-rays transmitted from an x-ray source; and
 - at least one aperture coupled to the first optical element and the second optical element, the aperture including a fixed portion and a movable portion that is movable relative to the fixed portion to adjust the shape of the aperture, the shape of the aperture being adjusted to adjust the convergence of the x-rays by selectively occluding a portion of the x-rays.

17. The x-ray reflective optic of claim 16 wherein the first reflective surface is orthogonal to the second reflective surface.
18. The x-ray reflective optic of claim 16 wherein at least one reflective surface has a substantially elliptic shape.
19. The x-ray reflective optic of claim 18 wherein both reflective surfaces have a substantially elliptic shape.
20. The x-ray reflective optic of claim 18 wherein one reflective surface has a substantially elliptic shape and the other reflective surface has a substantially parabolic shape.
21. The x-ray reflective optic of claim 16 wherein at least one reflective surface has a substantially parabolic shape.
22. The x-ray reflective optic of claim 21 wherein both reflective surfaces have a substantially parabolic shape.
23. The x-ray reflective optic of claim 16 wherein the fixed portion is a slit and the movable portion is a blade that moves across the slit.
24. The x-ray reflective optic of claim 16 wherein the fixed portion is a pinhole and the movable portion is a blade that moves across the pinhole.
25. The x-ray reflective optic of claim 16 wherein the fixed portion is a fixed blade and the movable portion is a movable blade.

26. The x-ray reflective optic of claim 25 wherein the fixed blade and the movable blade are positioned at or near the distal portion of the x-ray reflective optic relative to the source.
27. The x-ray reflective optic of claim 25 wherein the fixed blade and the movable blade are each substantially L-shaped.
28. The x-ray reflective optic of claim 25 wherein the movable blade is movable from a high-convergence position to a low-convergence position.
29. The x-ray reflective optic of claim 28 wherein in the low-convergence position, the movable blade occludes x-rays reflected from the far portion of the x-ray reflective optic.
30. The x-ray reflective optic of claim 16 wherein the first optical element is a first multilayer optic and the second optical element is a second multilayer optic.
31. The x-ray reflective optic of claim 30 wherein the first multilayer optic and the second multilayer optic have graded d-spacing.
32. The x-ray reflective optic of claim 31 wherein the first multilayer optic and the second multilayer optic have depth graded d-spacing.
33. The x-ray reflective optic of claim 31 wherein the first multilayer optic and the second multilayer optic have laterally graded d-spacing.
34. The x-ray reflective optic of claim 16 wherein the first optical element is a first x-ray reflective crystal and the second optical element is a second x-ray reflective crystal.

35. The x-ray reflective optic of claim 16 wherein the aperture is positioned between the source and the first and second optical elements.

36. An x-ray reflective optic comprising:

an optical element which conditions an x-ray beam, the optical element defining a near end and a far end; and

an aperture attached to the far end of the optical element, the aperture being adjusted to adjust the convergence of the x-ray beam by selecting a portion of the x-ray beam delivered by the optical element.

37. The x-ray reflective optic of claim 36 wherein the aperture is a diaphragm.

38. The x-ray reflective optic of claim 36 wherein the aperture includes a fixed portion and a movable portion that is movable relative to the fixed portion, the aperture being adjusted by moving the movable portion relative to the fixed portion.

39. The x-ray reflective optic of claim 36 wherein the fixed portion is a slit and the movable portion is a blade that moves across the slit.

40. The x-ray reflective optic of claim 36 wherein the fixed portion is a pinhole and the movable portion is a blade that moves across the pinhole.

41. The x-ray reflective optic of claim 36 wherein the fixed portion is a fixed blade and the movable portion is a movable blade.

42. The x-ray reflective optic of claim 36 wherein the optical element is a two-dimensional optical element.